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(54) IMPROVEMENTS IN OR RELATING TO AEROSOL DEVICES

(71) We, **BESPAK INDUSTRIES LIMITED**, a British Company, of Fieldings Road, Cheshunt, Waltham Cross, Hertfordshire, and **WILLIAM EDWARD WARREN**, a British Subject of 14 High Ridge, Cuffley, Hertfordshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to aerosol devices, and more particularly to an aerosol device including a pressurised aerosol dispensing container of the kind which has a tubular valve stem and which on depression of the stem measures out a metered quantity of fluid ready for discharge through the stem when the stem is released. Such aerosol devices will be referred to hereinafter as aerosol devices of the kind described.

With the aerosol devices of the kind described including aerosol dispensing containers known as inward-charging, outward-discharging containers pressing the stem or head inwardly of the container charges a metering chamber in the container and when released the stem or head returns under spring pressure, dispensing a metered dose of fluid.

The invention provides an aerosol device comprising a pressurised aerosol dispensing container of the type which has a tubular valve stem and which on depression of the stem measures out a metered quantity of fluid ready for discharge through the stem when the stem is released, a duct which is in fluid connection with the tubular valve stem and has an inlet end open to atmosphere and an outlet end arranged for insertion into the mouth of a user, a two-part strut having a first part to engage the stem and a second part which is manually engageable to move the strut between an inoperative position in which the stem is released and an operative position in which

the stem is depressed, a sensor in the duct, and means to move the first part of the strut out of engagement with the stem to release the stem when the sensor detects when a user inhales through the duct, the arrangement being such that release of manual pressure from the second part of the strut will also release the stem.

The device may, for example, be used with a pressurised aerosol dispensing container containing medicament for asthma sufferers. If the user manually moves the container and the strut towards one another and then sucks at the duct outlet he will receive medicament at or immediately after commencement of sucking.

The air pressure difference whereby the strut is disengaged is detected by a flow sensor which may be a vane in the duct sensitive to a pressure differential between the outlet end and the inlet end of the duct.

One specific example of the invention will now be described with reference to the accompanying drawing which shows a device for dispensing asthma medicament from a pressurized aerosol dispensing container.

Referring to the drawing, a plastic casing 51 has an outlet orifice 52 suitable for placing in the mouth of a user. The casing 51 defined a recess 53 in which there is placed an aerosol type medicament dispenser 54. The dispenser 54 has a stem or spray head 55 with an outlet orifice 56 in the side. Pressing stem 55 inwardly of the aerosol dispensing container causes a metering chamber (not shown) to be primed, and release of the stem allows a metered dose of medicament to issue from orifice 56.

In the device shown in the drawing, a press button 57 has a strut 58 integral therewith but pivotable about a flexible hinge. The strut engages the end of the stem 55, so that when the press button is

pushed inward then the stem is pressed into the dispenser 54 and the metering chamber is filled with medicament. Attached to the strut 58 is a lever arm 59, and this in turn is engaged by a vane 61 pivoted to the body of the device at a hinge 62. The vane 61 in its normal position as shown in the drawing blocks a duct within the casing 51 and extending between an air inlet 63 and the outlet orifice 52. However, when suction is applied at the outlet orifice 52 then the difference in air pressure across the vane 61 causes it to move in an anti-clockwise direction thereby opening the passage between the air inlet 63 and the outlet 52, and at the same time striking the lever arm 59 and causing both the lever arm and also the strut 58 to rotate in a clockwise direction about the hinge joint between the strut and the press button 57. It will be clear that, if before this occurs the press button 57 has been pressed inwardly to hold the stem 55 into the dispenser 54, then the above-described sequence of events will release the stem and spray head 55 so that it will move downwardly and the dose of medicament stored within the valve will be dispensed into the air stream flowing out of the orifice 52. It will be appreciated that in use of the device the asthma sufferer presses the push-button 57 upwardly and holds it and then draws breath through the outlet orifice 52; the arrangement ensures that the medicament is dispensed at the beginning of the inhalation thereby assuring maximum effect.

So as to ensure that the device resets itself after use, the strut 58 is provided with an extension 64 engageable with a spring loaded pin 65. When the device is operated the rotation of the lever arm 59 and the strut 58 by the vane 61 depresses the pin 65, but when the press button 57 is thereafter released the pin tilts the strut back towards the stem 55 to engage it.

The embodiment described is suitable for use with any reservoir of the appropriate size and having a metering valve which is primed on the inward stroke of the stem and dispenses medicament on the outward stroke. One particular form of such a metering valve utilises a hollow stem as the receptacle, and is charged by pressing the stem and spray head 55 inwardly past a stem seal until the orifice 56 is within the reservoir, whereupon medicament under pressure enters the hollow stem through the orifice, and subsequent release of the stem and spray head 55 dispenses the medicament. This is, however, only one of several possible valve constructions. In

some constructions the outlet orifice 56 is in the end of the stem, not the side.

Other modifications and improvements may be made within the scope of the invention claimed, as will be appreciated by those skilled in the art.

WHAT WE CLAIM IS:—

1. An aerosol device comprising a pressurised aerosol dispensing container of the type which has a tubular valve stem and which on depression of the stem measures out a metered quantity of fluid ready for discharge through the stem when the stem is released, a duct which is in fluid connection with the tubular valve stem and has an inlet end open to atmosphere and an outlet end arranged for insertion into the mouth of a user, a two-part strut having a first part to engage the stem and a second part which is manually engageable to move the strut between an inoperative position in which the stem is released and an operative position in which the stem is depressed, a sensor in the duct, and means to move the first part of the strut out of engagement with the stem to release the stem when the sensor detects when a user inhales through the duct, the arrangement being such that release of manual pressure from the second part of the strut will also release the stem.

2. A device as claimed in claim 1 in which the sensor comprises a vane in the duct sensitive to the pressure differential between the outlet end and the inlet end of the duct.

3. A device as claimed in claim 2 in which the first part of the strut carries a projection which is engageable by the vane to move the said first part out of engagement with the stem.

4. A device as claimed in any one of the preceding claims in which the two parts of the strut are pivotally connected together.

5. A device as claimed in any one of the preceding claims in which the two parts of the strut are spring biased into the position where the first part is engageable with the stem.

6. A device as claimed in any one of the preceding claims in which the two parts of the strut are integrally formed from plastics material.

7. An aerosol device substantially as hereinbefore described with reference to the accompanying drawing.

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This drawing is a reproduction of
the Original on a reduced scale.

